in FIG. **3***b*, the member **17***a* contacts the edge of hub **14***a*, i.e., the top disc in stack **16**, but not any of the discs below the top disc, as represented by hubs **14***b*, **14***c* and **14***d*, due to the angled taper of the member **17***a*. The force exerted by the arms on the hub need not be significant since the discs are quite light.

The members **17***a*, **17***b* and **17***c* are preferably adapted for a nominal amount of resilient deformation, such that by contacting the hub **14***a*, the edge of hub **14***a* is held by the outwardly applied force. For example, non-deformable stainless steel tubular rod is well suited for this application. In the preferred embodiment, member **17***a* is made from 3/16 inch stainless steel rod, and members **17***b* and **17***c* are made from 1/8 inch stainless steel rod.

The picker assembly can then be raised out of the way of the stack **16** and moved to another position where the disc may be deposited or removed.

In a preferred construction, two of the members **17***b* and **17***c* are rigidly fixed in position, and the one flexible biased member **17***a* is coupled for rotation about shaft **17***s*. The picker assembly is lowered to insert the opposing members into the cylindrical area defined by center holes **12**. Then the one member **17***a* is rotated about shaft **17***s* to positively engage the hub **14***a*. The picker assembly is then raised and moved to another position, where the one member **17***a* is rotated in the opposite direction on shaft **17***s* to disengage the hub **14***a*, thereby releasing the disc to allow it to fall into a disc hopper, or a compact disc recording unit, as described in more detail below.

The opposing members could have a number of different geometries, as will be apparent with one having skill in this area. For example, two members may directly oppose each other with at least one having a tapered relationship within the center hole region. It is also conceivable that a conical section, such as a deformable bladder, could be used. However, I have found that a simple and efficient electro-mechanical apparatus can be constructed using three opposing members to contact the hub at three points, as described above.

While it is preferable that at least one of the opposing members be tapered, it is conceivable that all of the members could be completely vertical. In that case, the members must be capable of slight deformation when contacting the hub such that only one disc is picked. Otherwise, if the members are strictly vertical then more than one disc will in all likelihood be picked from the stack.

It is also conceivable that a suitable geometry could be provided to have the picker arms grab the outside edge of the disc rather than engaging the hub. Thus, two arms could be vertically oriented to contact the outside edge of the disc at two points, and the third arm could be angled or tapered with an extreme outward bias, then operated to move inwardly sufficiently to contact the edge of the disc, but maintaining an angle relative to the vertical to avoid contacting any but the top disc in the stack.

It is also conceivable that the principles disclosed herein could apply to any stack of flat substrates having uniform dimensions, regardless of shape.

Referring now to FIG. **4**, a modular disk handling unit **20** utilizing the principles of the present invention is illustrated. The disk handling unit **20** includes a base module **22** having two compact disc recording ("CDR") units **24** mounted therein. In the preferred construction, base modules having four CDR units arranged in a line are provided, although the number of units included in a module is rather arbitrary and may be dictated more by physical or practical considerations. Such modules are suitable for interconnection to provide even longer lines of CDR units. These modules are useful, for example, to provide a simple electro-mechanically controlled means for mass recording of information content onto conventional compact discs.

As seen more clearly in FIG. **5**, the base **22** is preferably made from standard sheet metal which is formed to provide a support structure having two primary working surfaces, namely the front face **22***f* and the top face **22***t*. The CDR units **24** are mounted within openings **25** in the front face **22***f* of the base **22**, for example with conventional mounting hardware, such that the doors **26** of CDR units **24** open outwardly from the front face of the base. The interior volume of the base **22** is utilized only to contain the CDR units **24** and related wiring connections, although it is certainly conceivable that the base could be modified to include an integrated controller.

The base **22** includes an index rail **28** which is affixed to the top face of the base, for example by weldment. The index rail **28** includes end cutouts **29**, **30** on respective ends thereof, as well as position cutouts **31**, **32**, **33** along the rail. The position cutout **31** is located on the rail **28** in a position which allows picker assembly **50** to be centered with respect to the center line of CD's stored in the disc hopper **40**. The position cutouts **32**, **33** are located to correspond with the CD center line of CDR units **24**.

Additional modules may be interconnected together, and additional cutouts will therefore be provided which correspond to additional positions. A tab or some other covering means will then be used to cover end cutout **30** (and end cutout **29'** on the next module) so that the beginning and end of the index rail will be properly defined.

The base also includes a pair of tracks **34** which are affixed to the top face **22***t* of the base at the front and back edges thereof, for example by weldment. A disc picker assembly **50** is mounted on wheels **52** and adapted for movement across the top face **22***f* on tracks **34** in response to programmed control provided by a controller **90**, as will be described in more detail below.

The base further includes a hopper support plate **36** extending from the bottom of the front face **22***f* for supporting the disc hopper **40**, as will now be described with reference to FIG. **6**.

Disc hopper **40** preferably includes three vertical posts **42** which are affixed to the hopper support plate **36**, for example, by nut and bolt. Each of the posts **42** is a hollow steel cylinder containing a spring **44** axially disposed therein and having one end affixed to the top of the post and the other end affixed to a disc support plate **46**. The springs **44** impart an upward bias to the disc support plate **46**, and the weight of a stack of CD's loaded into the hopper **40** pushes the disc support plate **46** downward.

The vertical size of the disc hopper **40** is relatively arbitrary. The stacking density for CDR's is approximately eighteen per inch, therefore, a hopper providing a suitable number of discs may be easily constructed utilizing the principles described herein.

The picker assembly **50** is utilized to pick a single CD from the hopper **40** and deliver the CD to a CDR unit **24**, as will now be described with reference to FIGS. **7–10**.

The picker assembly **50** includes a motor housing **54** mounted for travel on wheels **52** across the top face **22***t* of the base **22**. A photoeye **55** is affixed to the bottom of motor housing **54** in a position to interrogate the index rail **28** at the height of cutouts **29–33**. The photoeye **55** thus provides control signals to controller **90** regarding the position of the motor housing **54** relative to the base **22**.